

The Use of DRR and EPI for Streamlining Prostate Radiotherapy Process

The Cancer Center for the Southern Interior (CCSI) commissioned its Picker AcQsim CT simulator in January 1999. The AcQsim enabled us to generate high quality Digitally Reconstructed Radiographs (DRRs) for each treatment field replacing conventional simulator film. These DRRs include an outline of the tumor volume and critical organs in the treatment field as well as required shielding, thus providing more information than a simulator film. Exporting these DRRs to the Electronic Portal Imaging System was not directly supported by the current version of the AcQsim software. However, we were able to import the DRRs to the EPI as the reference images using AcQsim screen capture and Network File Transfer Protocol (FTP).

Since the volume of prostate treatments do not have sufficient anatomical detail, a double exposure portal image is necessary for treatment verification. The dose delivered during the exposure in the port film mode of the Elekta SLI Linacs cannot be automatically subtracted from the daily treatment dose. Therefore, in order to acquire a good EPI and minimize the extra dose delivered during double exposures, an EPI acquisition procedure outside the port film mode was developed. The portal images acquired in this manner reveal adequate anatomical details for geometric field verification.

Having good quality portal images with the corresponding DRRs available on the first day of treatment, allowed us to eliminate the conventional simulation process in prostate radiotherapy treatments with confidence.